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Business and IT Alignment problems in Portuguese Companies

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Master Thesis
presented as partial requirement for obtaining the Master’s Degree in Information Management

NOVA Information Management School
Instituto Superior de Estatística e Gestão de Informação
Universidade Nova de Lisboa
BUSINESS AND IT ALIGNMENT PROBLEMS IN PORTUGUESE COMPANIES

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Master Thesis presented as partial requirement for obtaining the Master’s Degree in Information Management, with a specialization in Knowledge Management and Business Intelligence.

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STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

Lisboa, 2023
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ABSTRACT

The Portuguese economy has always demonstrated low levels of productivity. Portuguese companies cannot compete with its Europeans counterparts, this situation is not desirable leading to a low PIB per capita. One of the main benefits of achieving a positive business-IT alignment is to improve a company's overall productivity levels.

This master thesis tries to understand the Portuguese companies’ alignment levels, by getting to know some of them. Two objectives were defined, gathering information about the relationship between business and IT in some Portuguese companies and provide evidence if there is a relationship between the lack of Business IT alignment and the low levels of productivity present in Portuguese economy.

A survey performed by Jerry Luftman was done in the USA to try evaluating the level of fortune 500 companies, a survey following the same questions was done regarding Portugal. The survey results allowed us to characterize 15 Portuguese companies and understand how they operate. The results were used to try and help a company which alignment level was not desirable.

KEYWORDS

Business; IT; Business IT Alignment; Data / IT Governance; Portuguese Economic State

Sustainable Development Goals (SDG):
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<td>BPR</td>
<td>Business Process Reengineering</td>
</tr>
<tr>
<td>DSR</td>
<td>Design Science Research</td>
</tr>
<tr>
<td>DSRPM</td>
<td>Design Science Research Methodology Process Model</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>IS</td>
<td>Information Systems</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>PIB</td>
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<td>SA</td>
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<td>SAM</td>
<td>Strategic Alignment Model</td>
</tr>
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<td>USA</td>
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1. INTRODUCTION

In today's world IT has massive importance in our everyday life and is a core value in companies. For a long time Business and IT, alignment has become a top priority for IT workers and company executives (Zhou & Cai, 2011) but despite acknowledging the need and importance of this topic, IT and business are mostly seen as two different organisms that work separately from each other. It seems that this issue may be one of the contributors to the lack of productivity in Portugal, having in 2017 the fourth lowest productivity index in the European Union.

Ideally a company wants two have both IT and Business at the same “page”. The perfect scenario occurs when business can explain to IT it’s needs and the requirements that wants to implement, and IT understands the requirements provided and the company mission and vision. Luftman says that “alignment grows in importance as companies strive to link business and technology in light of dynamic business strategies and continuously technologies”, and so is a company wants to grow and prosper it is imperative to invest in its business-IT alignment.

There is a lack of investigation concerning the alignment maturity in Portuguese companies, the specific effects it has on the country economic performance have never been studied. The low GDP level presented by the Portuguese economy, and the low levels of technology used by businesses, illustrate the need to investigate and come up with solutions for this problematic. As mentioned, a well aligned company, is a successful company, and so our research question arises:

Can the low levels of alignment between Business and IT, be one of the contributors to the low levels of productivity in the Portuguese economy?

Trying to respond to our research question we have come up with two main objectives. These will better help us to gather a general state of how Portuguese companies work and what’s the impact of business IT alignment in the Portuguese economy.

- Gather information about the relationship between business and IT in some Portuguese companies.
- Provide evidence if there is a possible relationship between the lack of Business IT alignment and the low levels of productivity present in Portuguese economy.
2. LITERATURE REVIEW

2.1. PORTUGAL ECONOMIC STATE

In the late 20th century, 1981 the Portuguese GDP per capita was very similar to levels presented 15 years before (1971) (Teixeira & Fortuna, 2010). After entering the UE in 1986 a convergence process started, greatly caused by entering the European Union and the global economic boom that happened between 1986 to 1989. In the beginning of the 1990s significant inflows of external investment and funds started to arrive to the country, channelled greatly to infrastructures and to the manufacturing sector, with a big project, that to this day reveals to be crucial the Portuguese economy, Auto Europa. In the late 1990s imbalances started to show up, a “rise in labour costs was not supported by corresponding advances in labour productivity” (Teixeira & Fortuna, 2010). From 2000 onwards the rise of productivity in relation to the EU has been following a downward trend and not being able to catch up the average values of the European Union.

Twenty years after entering the EU Portuguese GDP remains around 60% of the average of the most well-developed countries (figure 1). This disappointing performance is caused by a sluggish economy, whose productivity is severely impacted by labour force schooling levels, investment in R&D and innovation. These indicators are much lower when compared with other EU members.

![Figure 1 - PIB per capita (PPS)](source: Pordata, 2023)
An indicator that allows us to illustrate the productivity issue is the productivity for each hour worked. Portuguese values are essentially 50 percent of the EU average (figure 2), meaning that resources are constantly being wasted, the number of hours worked per day in the European Union is roughly the same in all countries (8 hours per day), this is caused by the factors referred above, low specialized schooling levels, low management quality and lack of investment.

![Labour productivity per hour (PPS)](image)

**Figure 2 - Labour productivity per hour (PPS)**
Source: Pordata, 2022

Portugal has a low labour productivity growth. It is as low as half of the OCDE GDP per hour worked between 2015 and 2019 (OCDE, 2021) (figure 3), this led to overall company productivity. There is a low percentage of businesses using technology (figure 4), as displayed in the graph below, which contributes to the difficulty to compete with other countries, the level of workers that have basic digital skills is low (figure 5).
Figure 3 - Labour Productivity Growth
Source: Economic Survey of Portugal, 2021

Figure 4 - Proportion of Businesses using each technology
Source: Economic Survey of Portugal, 2021

Figure 5 - Share of people with the above basic overall digital skills
Source: Economic Survey of Portugal, 2021
2.2. **IT AND BUSINESS RELATIONSHIP**

Information technology (IT) is the use of any computers, storage, networking and other physical devices, infrastructure, and processes to create, process, store, secure and exchange all forms of electronic data. IT is defined as "all the technology that is used by an organization to collect, process, and disseminate information in all its form." (Onn & Sorooshian, 2013)

Business owners once had very few tools at their disposal: little more than a basic adding machine and paper records. Today’s business owners can complete their duties much more effectively than their predecessors with an array of technological tools at their disposal. By using these tech tools, companies and employees enjoy several business-related benefits (Nikoloski, 2012).

Previously IT was seen as a being expensive and not being able to provide useful outcomes for companies rather than a critical component for a successful enterprise.

2.2.1. **IS / IT and Data Governance**

“Data governance is an emerging subject in the information system (IS) field. In recent years, the volume of data used within organisations has increased dramatically, playing a critical role in business operations” (Alhassan, Sammon & Daly, 2016). To address problems with data quality, organizations need to focus on the main focus points, people, processes and quality. Data that is constantly being created and moved and needs to be governed, data governance is defined has the “process by which company manages quantity, consistency and usability, security and availability of data” (Cohen 2006).

Data governance is critical to companies because it allows them to define policies and procedures to guarantee an effective data management. IT allows companies to build common collaboration and knowledge management frameworks at various corporate levels. These common frameworks allow companies to continue working the same way and with the same levels of quality because knowledge is well kept inside the company.

IT/IS governance is defined as the process by which decisions are made regarding IT. How those decisions were made, what the result of those decisions was, who was made accountable for those decisions. IT is becoming essential in every company even in those where IT is not their main line of business, optimizing IT investments and decisions needs to be a priority. Having a framework like data governance is crucial. Implementing IT governance requires a framework based on 3 elements. **Structure, Processes and Communication.**
• **Structure** can be explained by who are the individual responsible for making decisions, what responsibilities will they have, what structures will be created, and who will be responsible for them.

• **Processes** is defined by how the investment decisions will be made, what the decision-making process is, who reviews them and prioritizes them.

• **Communication** conveys how the outcomes and decisions results will be monitored, acted upon, and communicated, how the communication will be made to transmit IT investment decisions, who will be present on this communication chain.

IT governance and data governance are essential to a well-developed strategic alignment between business and IT, it helps to foster communication inside the diverse areas of the company. Having a common framework is essential to engage both business and IT teams, by having premade policies, procedures and business processes, data governance can ensure the quality of data and help guarantee the business.

### 2.3. **Strategic Alignment**

Strategic alignment is a process where there is a concise and planned course of action to implement practices that lead to better support of an organization’s general objectives. This process became to be defined in 1962 by Chandler and in 1971 by Andrews. Alignment is seen as not only as a way to assist organizations by providing a clear vision for the future and a way of reacting to unexpected events but also in providing maximal returns on IT investment (Avison; Jones; Powell; Wilson, 2004).

The strategic alignment model SAM of Henderson and Venkatraman is composed by four quadrants with three components each, as seen in the figure below (figure 6), which is used to evaluate the level of alignment that the company possesses. The model does this evaluation based on two different areas Business and IT.

The strategic role of information systems involves using information technology to develop products, services, and capabilities that give a company strategic advantage over the competitive forces it faces in the global marketplace. This creates strategic information systems, information systems that support or shape the competitive position and strategies of an enterprise. So, a strategic information system can be any kind of sentence of information system (TPS, MIS, DSS, etc.) that helps an organization:

2. Reduce a competitive disadvantage (Nikoloski, 2012).
Business Infrastructure

The components related to this quadrant consists of the administrative structure, how an organization operates its day-to-day business, business processes refer to how the activities are involved and how they are performed and human skills that are possessed by their employees.

IT Strategy

This quadrant focuses on the technological scope used by the organization, the systems competencies and how much the business has information that is important to the company's strategy (Coleman, 2006), and IT governance that at its core at most basic is the process of making decisions about IT (Symons, 2005).

Information Technology Infrastructure

This quadrant is composed of IT architecture, the way IT components are articulated and chosen. Processes are how IT is used in their core activity, and skills refer to the human resources when in activity.

Business Strategy

Business scope is everything that refers to the activity of the organization, the distinctive competencies are all the things that make the business successful. The third component is the business governance and consists of all the relationships that exist inside and external to the company.

Figure 6 - Strategic Alignment Model
Source: Coleman, 2006
Another strategic alignment model (figure 7) has been presented by Maes (1999) where an additional functional and strategic layer has been added to reflect the need for information and communication. This model enlightens the need to have IT and business strategies working closer together as long as technologies evolve and there is a need to reflect the need to have a model more integrated model.

This framework allows to formulate solutions, for companies which are working to achieve higher goals of strategic alignment. The addition on the strategic integration and functional integration components allows the creation of paths to reach strategic alignment, for example a company struggling to get a well thought out partnership regarding a common Business strategy and IT strategy should focus on improving their communication between departments.

The SAM provides a way to measure the strategic alignment present in a company (figure 8), it focuses on 6 areas of maturity, communication, competency, governance, partnership, scope, and skills. Each company can be evaluated with a number from 1 to 5 (Zhou,2011) regarding their alignment between business and IT, ranging from level 1, Initial / Ad hoc process (where business and IT are not harmonized or aligned) to level 5, Optimized process (where the strategic planning of business and IT is integrated and reached a co-adaptive stage). The table above illustrates all the possible levels and attributes of each area.
Business Process Reengineering

A popular way to achieve a successful business-IT alignment is through BPR (figure 9), Business process reengineering, it consists of rethinking and radically redesigning the business processes and the company’s vision. If done right it will achieve dramatic improvements in cost, quality, speed, and service.

Business vision and objectives: Any BPR activity needs to begin with clearly defined and measurable objectives. Whether the goal is reducing costs, improving the quality of the product, or increasing efficiency, the framework for what needs to be achieved has to be decided upon at the outset, in line with the company's vision and mission (Nikoloski, 2012).
Strategic Alignment Model by Venktraman

The strategic alignment model proposed by Venktraman, Hederson and Oldach (figure 10), serves as a tool to achieve strategic alignment. Four dominant perspectives are identified and can lead to optimal symbiose between business and IT.
1. **Strategic Execution**: On this perspective business is seen as a driver to both organization and IT/IS. Board is regarded a strategy formulator and IS as strategy implementor. This option would be best suited for organizations with a strong business scope who are trying to achieve desirable IS infrastructure and processes.

2. **Technological Potential**: This strategy combines both strategies from IT and Business, IT is seen as a support to the required IS infrastructures and processes. Business responsible should provide the technological vision to better allow IT responsible to understand what is needed, in order to let the company to better implement their company vision. An IS manager is responsible for implementing the needed IT/IS infrastructure.

3. **Competitive Potential**: This alignment perspective explores the emerging capabilities of IT to impact products and services, and so it has a large influence on strategic decisions and is responsible for forming new relationships inside the company (data governance between departments). The IS responsible for managing and helping business responsible discover the correct path for the company and the missed opportunities from the past. This strategy can be the correct one for company whose core business are technological products.

4. **Service Level**: The service level perspective focuses on building top level IT/IS organization inside the company. The business responsible work is indirect. From perspective IT resources are used with effectiveness and responsive to the growing and fast changing end user needs. The IS responsible is more a like a business leader with specific task of making business succeed with the guidelines provided by top management.
3. METHODOLOGY

3.1. METHODS IN DESIGN RESEARCH METHODOLOGY

“DSR is a problem-solving paradigm that seeks to enhance human knowledge via the creation of innovative artifacts. Simply stated, DSR seeks to enhance technology and science knowledge bases via the creation of innovative artifacts that solve problems and improve the environment in which they are instantiated” (Brocke, Hevner, Maedche 2020). This methodology has gathered interest in the last few years, due to the capability to contribute with innovative solutions to real world problems.

The goal of a DRS research is to extend the boundaries of human and organisational capability to new artifacts. (Gregor, Hevner 2013). DSR has shown to be very beneficial and impactful in economic and societal areas.

Design science research provides various similar methodologies that can adapt to every context, such as SDRM, systems development research methodology, ADR, action design research, PADR, participatory action design research and among others.

Each of the methodologies mentioned above follow the six core dimensions DRS grid, that serves as a plan and a guideline for a project where a DRM is implemented.

Figure 11 - DSR Grid Comprised of the Six Core Dimensions of a DSR Project
Source: Brocke et al. 2020
**Problem Description:** what is the problem to which is worth possibly finding a solution? The research problem should be formed by the problem statement and by the problems positioning in the problem space.

**Input Knowledge:** What prior knowledge should be used in the DRS project? Prior to starting to solve the problem, the environment where the problem is inserted should be explained to clarify the possibly underlying causes. These inputs can be kernel theories, design theories and design entities.

**Research Process:** What are the essential activities planned to make the intended contribution? When designing the problem-solving process, it is crucial to apply what has been done before on similar projects (Brocke, 2020), this can be literature reviews and meta-analysis. The problem-solving process should include proper documentation and planning.

**Key Concepts:** What are the key concepts used in the research? The words selected to be the main focus of the research. A clear definition of the key concepts is crucial for a rigorous evaluation process.

**Solution Description:** What is the process that solves our problem? The solution should include the essential mechanism of the solution “and how the solution is positioned in solution space by characterizing its representation as a construct, a model, a method, an instantiation, or a design theory” (Brocke, 2020)

**Output Knowledge:** What is the output knowledge produced by the DSR project? DSR projects should output DK, “information about the important problem, the designed solution, and the evaluation evidence. Specifically, it includes measures of timely progress on how well the problem solution satisfies the key stakeholders of a problem.” (Broke, 2020)

### 3.2. Proposed Methodology

The best way to answer our starting question, does business IT alignment have an impact of Portuguese low values of productivity, is to talk and gather information directly from the users involved in Portuguese companies that use IT in their core business.

In order to evaluate the current situation regarding the business and IT alignment of Portuguese companies, we will create a survey with the necessary questions. This questionnaire will be used in a focus group with individuals from Portuguese companies, that use IT in their day-to-day business. Data will then be analysed and will be used to create an adoption model based on Enterprise alignment development method.
This methodology will follow a mixed method, using both qualitative and quantitative tools. Although there are challenges in comparing data of different types systematically, relying solely on quantitative research, it would fail to fully capture the unique experiences of participants, whereas relying solely on qualitative research would limit the generalizability of the findings.

The research methodology chosen will consist in a design science research methodology process model (DSRPM) (figure 12), proposed by Vaishnavi and Keuchler in 2007.

This methodology consists of 5 steps, awareness of the product problem, suggestion, development, evaluation and finally conclusion.

- **Awareness of the problem:**
  - The first step is to understand what problem is happening, our interest sparked when we saw the low productivity levels of Portuguese companies, and what impacts does the possibility of lack of alignment between business and IT departments could have on those levels.

![Figure 12 –DRSM Road Map](source: Keuchler & Vaishnavi, 2008)
Suggestion:
- On this step we started by formulating some questions that would allow us to better understand what is happening in Portugal, and so our research objectives were formulated:
  - gather information about the relationship between business and IT in some Portuguese companies.
  - gather evidence if there is a possible relationship between the lack of Business IT alignment and the low levels of productivity present in Portuguese economy.
- There were some suggestions that led us to choose these two goals, when talking with persons that worked on the area and hearing their complaints.

Development:
- This stage of our process consists in materializing our goals into actions. A survey was developed, as explained above, to get insights from people that deal with this problematic in their day to day. 15 workers from 15 companies answered our survey, which allowed us to develop a qualitative and quantitative insight into what’s happening.
- A process of developing a plan to achieve business IT alignment is also present, by using what we learned with our data and based on past literature findings.

Evaluation:
- In this type of methodology, the research project frequently iterates between development and evaluation, rather than a typical waterfall model (Kuechler, Vaishnavi, and Petter, 2005), when evaluating the results new ways of solving problems appear.
- Regarding data evaluation, we opted to create an excel file with all the questions and correspondent answers, with the level each person attributed. We then averaged out all the answers for each of the surveyed persons. All the areas of alignment have an overall average value regarding their maturity level. Standard deviation is also present to signify the dispersity of the answers.

Conclusion:
- Regarding our conclusion step we opted for using our conclusions and findings and applying them to solve our main problem, lack of business-IT alignment. Using all that we learned until this point, this plan to try to improve alignment for a specific case.
3.2.1. SURVEY STRUCTURE

The questions used will be based on the questions proposed by Luftman in his research, where 1051 executives from fortune 500 companies answered his questions, regarding the enablers and inhibitors to align business and IT strategies. The survey questions were performed in person and remotely to 15 different company representatives. Every one of them were currently working for the respective company and have answered the questions related to their company.

The survey questions can be found on the appendix.

This diagram (figure 13) serves as a road map for the data collection and output process.

Our main goal with this survey, was to gather information about the relationship between business and IT in some Portuguese companies. With this data we can formalize some opinions concerning how well developed is the business IT coordination in some Portuguese companies.

Our second goal was to attempt to prove a possible relationship between the lack of Business IT alignment and the low levels of productivity present in Portuguese economy.

After all the data collection, treatment and conclusions, a strategic alignment roadmap will be conceived, illustrating how in cases where there is a lack of business IT alignment and how can those problems be mitigated.

Concerning the relationship between the lack of business IT alignment and low productivity levels, some provided answers will serve as support for our findings.
4. EMPIRICAL STUDY

4.1. DATA COLLECTION FINDINGS SURVEY STRUCTURE

After analysing 15 responses, we obtained some interesting findings regarding the survey about Business and IT Alignment Issues at Portuguese Companies.

Regarding biographic questions, we have an unequal distributed relationship between men and women with a ratio of 2 men to 1 woman.

There are more people working with IT than there is with Business, with a 60% to 40% distribution. All our respondents are between 19 and 64 years old. The 26 - 64 group is more represented than the 19 - 25. The company activity most present with more than 70% is the “IT and consulting” area, administrative sector, construction, transports and warehousing and extractive industries are also present.

On the first question, most answers point to IT not knowing enough about the business, with the most chosen option being “there is a limited understanding by IT of the business”, followed by IT lacks understanding of the business.

On question number 2, “What do you know about the understanding of IT by the business?” the most answered option was “there is a limited understanding of IT by the business”, most survey answers think that the understanding of IT by Business is limited but 40% also think that there is a good understanding, and some believe this understanding is promoted.

On the third question regarding the contact between IT and business employees, that there are good levels of contact between both parties, most cases employees can contact each other, and this is done by making an official appointment, or at least they are able to contact each other without any official appointment.

On questions 4 and 5 regarding value measurement, most users don’t know if any metrics are used by IT or if benchmarking is done by IT/business.

On questions 6 and 7 regarding Governance, a common pattern is found, either on IT and Business strategy creation process, the most chosen option is, IT and Business are included in each other decision process.

On question 8, regarding the use of a steering committee inside a company, most users don’t know if there is a steering communication, followed by the option, there is a steering committee and they meet regularly.
Regarding partnership 2 questions where presented, the first one was about the perception of use of IT in the company, and the most chosen option was “IT makes it possible to perform the activities in the business and controls the direction in which these activities are going”, and the other chosen answers point to IT being very valuable to the company and business processes. On the second question more than 50% of respondents think that IT and business have started to share risk and rewards.

On the technological scope chapter, we can conclude that in most answers, 80%, there is some kind of standards being used in companies. On the IT infrastructure topic, most users see IT as an important tool that enables business activities to be performed, followed by a way to create business value.

On chapter 6, skills, we can see that there is a very low rate of job transfers between business and IT, or even not possible. Regarding the attraction and retention of talented individuals, we can observe that most companies have a retention program, and when the hiring process occurs, there is a focus on both business and technical skills.

4.2. **First Goal**

In order to achieve our first goal of *gathering information about the relationship between business and IT in some Portuguese companies* we have collected data to formalize some opinions concerning how well developed is the business IT coordination in some Portuguese companies. It consisted in quantifying every question that was answered, and evaluating the maturity level for every strategic alignment area. We have come up with average level for each area for the total of responders. A more detailed evaluation was also made with an average level for every one of the inquired persons.

The maturity levels have a granularity of 1, a level that corresponds to an integer number between 1 and 5. On our survey we also have responses with the value 0 that corresponds to the inquired person not knowing how to answer the question. We chose to have our averages with 2 decimal places, to better compare the maturity levels between each other.

Regarding the maturity level of each of the SA areas, each area has the following levels:

<table>
<thead>
<tr>
<th>SAM Areas</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Level</td>
<td>2.96</td>
</tr>
<tr>
<td>Value Measurement Level</td>
<td>2.44</td>
</tr>
<tr>
<td>Governance Level</td>
<td>2.96</td>
</tr>
<tr>
<td>Partnership Level</td>
<td>3.16</td>
</tr>
<tr>
<td>Technological Scope Level</td>
<td>3.16</td>
</tr>
<tr>
<td>Skill Level</td>
<td>2.97</td>
</tr>
<tr>
<td>Overall Average</td>
<td>2.94</td>
</tr>
</tbody>
</table>

Table 1 - SAM Areas Maturity Levels
The area with the lowest result was value measurement with a value of 2. A value of 2 in the context of **IT value measurement/competency** maturity corresponds to an environment where companies only measure their functional cost efficiency.

Accordingly, to Luftman’s survey, “Maturity assessments have ranked this component as next to last among the SAM components with the average maturity score of 3.09” (Luftman, 2008), the present level of 2 regarding value measurement is in line with the findings described by Luftman of being one of the areas with lower score, but our average score of 2 present on the inquired Portuguese companies, shows that this score has a significance. This value can be attributed to either the lack of knowledge the survey respondents about their company or to a group of metrics that are ignored by the group of inquired companies.

Both the **technological scope and partnership** scored 3.16, being the top performers regarding maturity levels. These results share the same findings as Luftman, having these two areas being the top performers with the same maturity levels.

Technological scope and architecture having a level of 3 regarding maturity encompasses that there is an integrated process across all the organization, meaning a flexible infrastructure with the ability to enable and drive business process changes. Looking at our demographic data, this high level can be attributed to most of the individuals who answered the survey being from IT/consulting companies, organizations where there is normally a bigger investment in IT infrastructure and an understanding the importance of IT to the business process and its respective contributions.

The average level for **communication** was, 2.96, this component measures the quality and effectiveness of knowledge sharing and comprehension between departments. Most of the questions of this components fall back on how departments communicate and how frequently they do it, low levels represent low work awareness between business and IT. The value that we got is a bit lower than the one observed by Luftman of 3.09. The standard deviation value (0.88) is the lowest of all maturity components, indicating a that most answers select a level 3 answer with the following attributes (Good understanding; relaxed communications, emerging), and that there isn’t a lot of extreme level chosen 1, business IT lacks understanding and level 5, communication is informal and pervasive.

On Luftman’s survey the average value of maturity for **IT Governance** was 3.20, our survey on Portuguese companies returned a lower value of 2.96. This governance levels translates into a well connect business and IT, with relevant governance process across all the company. Comparing both surveys obtained values, both are very similar, being a level 3, thus the observed Portuguese companies a bit lower.

Regarding skills the registered value was 2.97 (level 3) very close to Luftman’s level, meaning an attempt of having a hiring process equally capable of finding collaborators with high levels of technical and business characteristics, a high valuation on keeping and maintaining workers.
After analysing all strategic alignment areas, we can come up with an overall value for maturity level (2.94) of the inquired companies. This value indicates there is still work that can be done in order to improve SA. As also found by Luftman, IT workers responses tend to be higher than business workers, and that can also be observed in our case.

<table>
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<tr>
<th>Participants</th>
<th>Communication</th>
<th>Value Measurement</th>
<th>Governance</th>
<th>Partnership</th>
<th>Technological Scope</th>
<th>Skills</th>
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Table 2 - Strategic Alignment Values Table For All Participants

4.3. **SECOND GOAL**

Gather evidence if there is a possible relationship between the lack of Business IT alignment and the low levels of productivity present in Portuguese economy.

Business IT alignment has proven to have massive benefits for every company, and so has a top priority for almost all business/IT managers. In 2021 Samgwa Quintine Njanka, Godavari Sandula and Ricardo Colomo-Palacios, have reported benefits such as:

- **Enhanced cooperation**, “shared IT-Business understanding enables the organization to conceive, implement, and use innovative IT applications to improve process performance” (Njanka et al. 2021)

- **Higher return on Investments and performance enhancement**, research show in particular higher levels of performance ins SMEs than small and medium enterprises with low levels of Business IT alignment, this situation can also be translated into higher levels of productivity.
- **Enhanced competitive advantage**, able to sustain an edge over the company competitor’s, a well coupled business and IT teams, have a natural impact on the business and IT alignment levels, but also their representatives. CIO and CEO, have a great importance when manging their departments but also an indirect impact on their worker commitment.

- **Facilitates organizational process and growth**, when alignment is present, IT crucial to the company strategies, by result IT contributions and investment are more likely to be well accepted by the rest of the company, and consequently foster the company's growth.

By analysing the benefits stated above, more specifically, the higher return on investments and performance enhancement, we can clearly observe that an investment on Business and IT alignment practices clearly contribute to a boost in overall productivity. By allowing daily working processes occur more freely and more aligned between distinct departments.

Questions 1 and 2 of the survey concerning communication inside the company demonstrate that regarding business understanding by IT and vice-versa, the levels of knowledge of each other areas are very limited, and so emphasizing the lack of strategic and functional integration between departments.

Bearing fact in mind, we can rely on the SAM areas and maturity levels, to help quantify the level of alignment in at least one identified area, communication maturity (figure 14).

![Figure 14 - SAM and IT Areas, Maturity Levels and Attributes - Communication Area](Source: Njanka et al. 2021)

Regarding the table above we can conclude that in most cases, the majority of inquired companies have a level 2, regarding communication maturity, more specifically understanding of business by IT and understanding of IT by business.

There is a limited business/IT understanding inside the company, and so there is a commitment process, where the organization has committed to be aligned with IT but has not been established yet (Njanka et al. 2021).
The goal of gathering evidence about a possible relationship between the lack of Business IT alignment and the low levels of productivity present in Portuguese economy, can be accomplished. We have observed a general lack on alignment regarding communication inside the surveyed companies. “Effective communication strengthens the connections between a company and all of its stakeholders in numerous ways: (...) increased productivity and steadier workflow” (Condruz-Bacescu, 2023) stronger communication also leads to less wasted money, higher employee satisfaction and better financial results. Being one of the objectives and benefits of a business IT alignment model to help strengthen the communication between departments, we can conclude that the lack of business alignment found at least on the communication maturity area can be a contributor for the low levels of productivity in the Portuguese companies.
5. RESULTS AND DISCUSSION

5.1. PROPOSED SOLUTIONS FOR IDENTIFIED CASES WITHOUT STRATEGIC ALIGNMENT

Achieving a total strategic alignment between IT and a business might seem at the surface an utopic goal, achieving total maturity levels on all areas aspects might be almost impossible, but it is very possible to delineate a plan in order to improve and achieve at least a sufficient level of strategic alignment.

The first step on achieving strategic alignment between IT and business is to identify what is the root cause. We have chosen 1 case with an overall alignment level lower than 3, to try to come up with a strategic alignment plan, all responses were between 1 and 5, having no answer 0 (not knowing how to answer), this allows us to focus on real alignment problems and remove cases where company workers don’t know how to answer to a question.

The first case interviewed number 12:

- **Communication maturity** has a value of 1.67 (level 2), meaning this company has a limited business/IT understanding.

- **IT value measurement** is the lowest level present, this company only measures functional cost efficiency. With a value of 1.33 (level 1). Only some technical measures are made.

- **Governance maturity** has a value of 2.33 (level 2), there is a governance at functional level and there is a responsive tactic when faced with difficulties.

- **Partnership maturity** is characterized has seeing IT as an asset and not a cost, there is a process driven business scope and conflict is seen as way to solve problems. This is the component with the highest value, (level 3).

- **Technological scope and architecture maturity** is considered a level 3, with a value of 2.50. The scope and architecture is applied as one across the company, there are standards used and investment on IT infrastructure.

- **Skills maturity** has the same value as Technological scope maturity, with a level 3, the hiring process has a focus both on technical and business capability, and there is a program to keep professionals in the company.

After analysing the levels on alignment maturity of the company of interviewed number 12, we will come up with a plan to improve the areas in need, more specifically areas with a level lower than 3. These areas are communication, IT value measurement and governance maturity.
Looking at the strategic alignment model (figure 15), is it possible to choose a perspective that aligns with the strong and weak components of our case. Having a company that sees IT as a way to potentiate their business process, where there is a common and stable scope/architecture present and a focus on both on soft and hard skills of its workers, a technological potential strategy is the preferred to improve the maturity levels presents. This perspective brings up positive component that the company has. Strong Information infrastructures, well capacitated workers, and a sense that IT is the way forward. The technological potential combines both the strategy of IT and business, business being stronger on our case is responsible for providing the vision that IT is in need.

![Strategic Alignment Model](image)

Figure 15 – Venkatraman Strategic Alignment Model, Alignment Perspectives
Source: Value Based Management (2023.).

Regarding the specific problems such as communication between departments, it is very important to make sure that business understands the “Why”, why are things done and the business outcomes it will deliver.

Scheduling monthly or bi-weekly between departments where the scope is not a very complex and tedious presentation, but a simple presentation where business workers can understand the work IT is doing. The focus should be “keep it simple”, without too much IT acronyms and concepts. Overall, the objective is to allow both departments to work together and everyone has at least a concept of each other’s work.

Corporate Governance is just not about compliance, an effective way to improve governance starts at the board level. The entire company needs to understand the board’s role in the formulation of the company intended purpose. Members of the Executive Committee need to review the organization and its investment portfolio to make sure strategies reach their intended goals. A truly great Executive Committee will also review organizational performance (including processes and policies) to anticipate future needs.
and avoid regulatory infractions. Having an emphasis on accountability, every worker knowing that their work has an impact on the company's output, and so understanding that their work is important and so is the focus on accountability.

As said earlier reaching a perfect maturity level regarding business IT alignment is an utopian idea, the road map described above represents a way to try to increase SA levels and should be taken in consideration only in this specific case. Achieving high levels of strategic alignment is not a prescriptive plan but some guidelines should be taken into consideration, in order to create a realistic plan an information system’s responsible should be designated to work with the company in question.

### 5.2. Results Discussion

When starting this process a research question was defined, “*Can the low levels of alignment between Business and IT, be one of the contributors to the low levels of productivity in the Portuguese economy?*” and based on the knowledge gathered on the literature review and the starting chapter two objectives were also created, “*gather information about the relationship between business and IT in some Portuguese companies*” and “*Gather evidence if there is a possible relationship between the lack of Business IT alignment and the low levels of productivity present in Portuguese economy.*” To achieve both objectives and answer the starting question, a analytical process has been used.

Through design research methodology a survey to evaluate how some Portuguese companies were directing their work. We learned that for the first objective, that even though the overall maturity level was a level 3 out of a scale from 1 to 5, our level is very similar to companies from the biggest study done in this area by Luftman. Some areas have in average lower values than others, such as value measurement, some companies have a significant communication problem, this situation can be improved, understood, and analysed on the second objective.

After tackling both objectives we had enough insights and knowledge to try to solve a specific case of low Business/IT alignment, even though this case cannot be generalized some suggestions can be used to help in cases of low business alignment.

To answer our research question, we can conclude that we can indeed create a connection between the low levels of alignment between IT and business and the low levels of productivity in the Portuguese economy. It has been proved that high levels of business/IT alignment can lead to enhanced competitive advantage, facilitated organization process and growth and ultimately higher ROI. So, if generalized effort was achieved by Portuguese companies of investing on their business/IT alignment the productivity levels of the Portuguese economy would be positively impacted.
6. CONCLUSIONS AND FUTURE WORKS

6.1. CONCLUSION
The Portuguese economic state has made every Portuguese resident think about it at least once, the productivity levels and the resources lost have made everyone grim when reading some news.

Attaining a successful and perfectly aligned symphony between Business and IT inside a company, may seem utopian but this process has been already quantified and solutions were proposed in other countries such as the USA and by authors like Luftman.

This master thesis proposes to try understanding and help solve the two problematics described above. By trying to gather an image of what’s happening in Portugal and finding solutions for identified cases of low business/IT alignment.

After all this process the most important output is the fact that a country wide investment on improving Business/IT alignment would be very beneficial not only to the Portuguese economy but also all the companies involved and respective workers.

6.2. FUTURE WORKS
Regarding future work about this problematic, there is still work that be done in the future:

- Having a bigger poll of companies participating in a larger survey, this would better create a representative and real image of what’s happening in the country.
- The survey could be adapted and have specific questions for developers and business workers and a different one for board members, this would allow us to have a clearer image of both profiles.


Onn, C. & Sorooshian, S. (2013). Mini Literature Analysis on Information Technology Definition. Information and Knowledge Management, 3(2), 139. ISSN 2224-5758 (Paper) ISSN 2224-896X (Online).


8. APPENDIX

Survey Questions

Our Survey is composed of 3 biographic questions, and 15 survey questions with a total 18 questions. They are used to evaluate the degree of alignment between IT and business deciders. The survey can be answered by anyone that understands how IT is used and how business is performed inside of the company. The respondents don’t have to work directly with Information technology and can work more on the business side of the company.

All questions have 6 possible answers and has an option that can be chosen if the person responsible for answering the questions does not know how to answer, all other answers vary according to the business IT alignment present in the company.

The questions are divided into 6 areas concerning Business IT Alignment:

1. Communication inside the company
2. Value measurement
3. Governance
4. Partnership
5. Technology scope
6. Skills

This survey will be sent by email to relevant companies that conduct their business in Portugal, the survey will be conducted by google forms in order to save the results and responses given.

1. Biographic Questions:

1) Gender:
   a) Male
   b) Female

2) In your company your position can be seen more as working on business side or IT?
   a) Business
   b) IT

3) Age Group:
   a) 0 – 18
   b) 19 – 25
   c) 26 – 64
   d) >65
4) Company activity area:
   a) Agriculture, animal production and fishing
   b) Extractive industries
   c) Transforming industries
   d) Waste management
   e) Construction
   f) Retail trade (Comércio de retalho)
   g) Transports and warehousing
   h) Housing, hotel and restaurant sector
   i) IT and consulting
   j) Education
   k) Administrative sector
   l) Arts, sports and recreative activities

Area 1 - Communication Inside the Company:

Communication inside a company refers to the exchange of information, ideas, and messages among individuals and various organizational levels within the company's internal environment. It involves the transmission, reception, and interpretation of information with the purpose of facilitating collaboration, coordination, and the achievement of organizational goals.

2. In order for business and IT to communicate well with each other, it is important that IT understands the business. What do you know about the understanding of the business by IT? Choose the statement that best describes your perception of this aspect. If you're from IT, then the question you need to answer is: what do you think that the business thinks of IT's understanding of the business?

   a) I don't know how well IT understands the business.
   b) IT lacks understanding of the business.
   c) There is a limited understanding by IT of the business.
   d) There is a good understanding by IT of the business.
   e) There is a good understanding by IT of the business and this understanding is encouraged.
   f) There is a good understanding by IT of the business, because it is required of all IT employees.
3. In order for business and IT to communicate well with each other, it is important that the business understands IT. What do you know about the understanding of IT by the business? Choose the statement that best describes your perception of this aspect. If you're from the business, then the question you need to answer is: what do you think that IT thinks of business' understanding of IT?

   a) I don't know how well the business understands IT.
   b) Business lacks understanding of IT.
   c) There is limited understanding of IT by the business.
   d) There is a good understanding of IT by the business.
   e) There is a good understanding of IT by the business and this understanding is encouraged.
   f) There is a good understanding of IT by the business, because this is required of all business employee.

4. To communicate, it is necessary to contact one another. When looking at the way in which business and IT employees contact each other, what can be said about contact between business and IT employees? Choose the statement that best describes your perception of this aspect:

   a) I don't know whether business and IT employees are able to contact each other.
   b) Business employees can contact IT employees, and this is done by making official appointments.
   c) Business employees can contact IT employees; they don't necessarily have to make an official appointment.
   d) Business and IT employees are able to contact each other, and this is done by making an official appointment.
   e) Business and IT employees are able to contact each other; they don't necessarily have to make an official appointment.
   f) Business and IT employees are able to contact each other; they can just walk over and chat.
Area 2 - Value Measurement:

Value measurement refers to the process of quantifying or assessing the worth, significance, or impact of a particular entity, action, or outcome. It involves using relevant metrics, indicators, or criteria to determine the value or value-added aspects associated with a specific object, event, process, product, service, or investment.

5. IT may have ways to measure the value of projects. These measures are called metrics. There are different types: technical performance (uptime of applications or servers for example), technical cost (like maintenance costs of applications) or effectiveness. Sometimes, also metrics from Human Resources (HR) and business partner’s are used. What do you know about the use of IT metrics? Choose the statement that best describes your perception of this aspect. If you’re from the business, then the question you need to answer is: do you know whether IT uses metrics?

   a) I am not aware of any use of metrics by IT.
   b) Only technical metrics are used.
   c) Only technical metrics are used, but they are rarely reviewed.
   d) Both types of technical metrics are used, reviewed and acted upon; also the return on investment (ROI) is included.
   e) Technical metrics, ROI are used as well as effectiveness metrics.
   f) Technical metrics, ROI, effectiveness are used as well as HR and partner metric.

6. The business may have ways to express the value of a project. These measures are called metrics. There are different types: Costs, like cost per unit (in manufacturing for instance), Return On Investment (ROI) or for example, customer value. What do you know about the use of metrics by the business? Choose the statement that best describes your perception of this aspect. If you’re from IT, then the question you need to answer is: do you know if the business uses metrics?

   a) I am not aware of any use of metrics by the business.
   b) IT investments are measured rarely, if ever.
   c) Cost metrics are measured, but rarely reviewed.
   d) Cost, ROI metrics are used, reviewed, and acted upon.
   e) Cost, ROI metrics are used as well as customer value.
   f) Cost, ROI, customer value are used as well as partner metrics.
7. In order to find out how well a project is or has been performed, it may be the case that benchmarking takes place. If you're from the business, the question you need to answer here is: is benchmarking performed in the business? If you're from IT, then the question you need to answer is: is benchmarking performed in IT? Choose the statement that best describes your perception of this aspect:

a) I am not aware of any benchmarking activities by business or IT.
b) This is done seldomly or never.
c) Sometimes benchmarking is performed.
d) Benchmarking may be performed, but there is seldomly acted upon the results.
e) Routinely benchmarking takes place and usually the results are acted upon.
f) Routinely benchmarking takes place, is acted upon and the results of these actions are measured.

Area 3 - Governance:

Governance refers to the set of processes, practices, and structures through which an organization or a system is directed, controlled, and regulated. It encompasses the mechanisms and arrangements that define how decisions are made, how power is exercised, and how accountability is ensured within an entity or among different entities.

8. In the company, a business strategy is developed and executed. What do you know about the involvement of business and IT in the strategy creation process? Choose the statement that best describes your perception of this aspect:

a) I am not aware of this strategy creation process.
b) There is no strategy creation process.
c) There is a strategy creation process at business unit level with slight IT input.
d) There is a strategy creation process across multiple business units and there is some IT input.
e) There is a strategy creation process at business unit, company level and IT is included in the process.
f) There is a strategy creation process at business unit, company level and this process includes business partners as well (besides IT).
9. In the company, a strategy for IT is developed and implemented. What do you know about the involvement of business and IT in the strategy creation process? Choose the statement that best describes your perception of this aspect:

a) I am not aware of the IT strategy creation process.
b) There is no creation process or it is only done as needed.
c) There is a creation process at business unit level with slight business input.
d) There is a creation process across multiple business units with some business input.
e) There is a creation process at business unit, company level and business is included.
f) There is a creation process at business unit, company level and includes business partners (besides business).

10. In order to allocate resources to projects, a steering committee may be used, to prioritize projects. Are you aware of the existence of such a committee and their functioning? Choose the statement that best describes your perception of this aspect:

a) I don’t know if there is such a committee.
b) There is no such committee.
c) There is a committee, and they meet informally as needed.
d) There is a committee, and they meet regularly.
e) There is a committee, and it has been proven that this committee is effective.
f) There is a committee which also includes members of business partners and this committee is effective.
Area 4 - Partnership:

In a business perspective, a partnership refers to a legal and contractual relationship between two or more individuals or entities who come together to carry out a business venture for profit. Partnerships are a common form of business organization where the partners pool their resources, skills, and expertise to jointly operate and manage the business.

11. What do you think about the business perception of the use of IT in the company? Choose the statement that best describes your perception of this aspect. If you're from IT, then the question you need to answer is: how do you think that the business perceives the use of IT?

a) I don’t know what the business thinks of the use of IT.
b) IT is just a cost of doing business.
c) IT is becoming valuable to the company.
d) IT makes it possible to perform the activities in the business.
e) IT makes it possible to perform the activities in the business and controls the direction in which these activities are going.
f) IT is a partner with business in creating business value.

12. In projects and performing of activities, there may exist risks. Also rewards for IT and the business may exist for projects and activities. When it comes to risks and rewards, what do you know about sharing of them between business and IT? Choose the statement that best describes your perception of this aspect:

a) I am not aware of any sharing of risks and rewards between business and IT.
b) IT takes all the risks but receives no rewards.
c) IT takes most risks with little reward.
d) IT and business are starting to share risks and rewards.
e) IT and business always share risks and rewards.
f) Actually, managers are encouraged to take risks.
Area 5 - Technology Scope:

Technology scope refers to the range or extent of technologies that are considered relevant and applicable within a particular context or domain. It defines the boundaries and parameters of the technological tools, systems, and solutions that are included or excluded from consideration for a specific purpose or project.

13. Are there standards used in the company? For instance, standards may be used for saving documents (open formats), project management or other processes/activities, and so on. If you're from the business, consider this aspect specifically for the business. If you're from IT, consider this aspect specifically for IT. Choose the statement that best describes your perception of this aspect:

a) I am not aware of any use of standards.
b) There are no standards used.
c) Standards are used and this makes it possible to perform all the activities in a business unit.
d) Standards are used and this makes it possible to perform the activities in a business unit and also control the direction in which they are going.
e) Standards are used and this makes it possible to perform the activities in a business unit, control them and thereby execute the business strategy.
f) Standards are used and this results in IT and business' ability to quickly adapt to change.

14. What can be said about the IT infrastructure in the company? Examples of parts of the IT infrastructure are: servers, internal telephone units, laptops, computers, the cabling, internal network etc. Choose the statement that best describes your perception of this aspect:

a) I don’t know how to describe the IT infrastructure.
b) The IT infrastructure is just a cost of doing business.
c) The IT infrastructure is becoming valuable to the company.
d) The IT infrastructure makes it possible that activities in the business can be performed.
e) The IT infrastructure makes it possible that activities in the business can be performed and it controls the direction in which the activities are going.
f) The IT infrastructure helps to create business value (combined with the business).
Area 6 – Skills:

Skills refer to the competencies and proficiencies required to effectively navigate the intersection of information technology (IT) and business domains. These skills combine technical knowledge and expertise in IT systems, tools, and methodologies with a deep understanding of business principles, processes, and strategies.

15. It can be the case that employees in IT want to switch to a job in the business or vice versa. What do you know about the existence of possibilities to switch between IT and business jobs? Choose the statement that best describes your perception of this aspect:

a) I am not aware of any job transfers between business and IT.
b) Job transfers rarely occur. Job transfers occasionally occur within a business unit.
c) Job transfers regularly occur at business unit management.
d) Job transfers regularly occur in all business units.
e) Job transfers regularly occur at business unit and company level.

16. To keep the company dynamic and able to deal with its changing environment, new employees can be attracted that have fresh new ideas. What do you know about the things that the company does to attract and keep talented IT and business people? Choose the statement that best describes your perception of this aspect:

a) I am not aware of the ways in which top business and IT talent is attracted and kept.
b) There is no specific way (like a program) used and there is poor recruiting.
c) When IT people are hired, the focus is on their technical skills.
d) When employees (IT/business) need to be hired, there is a focus on both business and technical skills; a program to keep them exists.
e) There is a specific way (program) to hire and keep talent, but it is not known how well it works. There is a specific and effective way (program) to hire and keep talent.